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I have outlined in a previous paragraph something of the prerequisites to good work in the field, and with these alone one may obtain results that will prove of great interest and value. But there are other phases of the subject which need attention. These are morphological and physiological, and through such studies only can we hope to solve completely the adaptation of lichens. Albert Schneider's Text-Book will furnish Americans much of value in such investigations, and the writer's Minnesota papers attempt to discuss to some extent the relation of structure and function to environment. I have suggested a knowledge of the literature as a prerequisite to the study of the distribution of lichens without citing names of authors or works. In the less generally known field of structural and physiological studies of lichens it may be well to make mention of some European authors. In giving a short list one must omit much of value. However, I shall venture to refer to the works of G. Bonnier, M. Funfstuck, H. Jumelle, G. Krabbe, G. Lindau, J. Reinke, S. Schwendener, and H. Zukal. These men have not had ecologic distribution chiefly in mind in their studies, but one will find much of value bearing upon the subject in their writings.

In such studies as I have suggested one may well confine his researches to a limited area with most excellent results. It is possible to do good work in an area of moderate size in a single season only after one has had years of experience in observing and studying lichens both in the field and in the laboratory. Indeed there is room for extended study of lichen formations of a given type, as those of the smooth bark, those of the rough bark, those of the boulders, those of the earth, those of the calcareous rocks, or those of a given genus or even species of tree. In fact it is only when we confine ourselves within reasonably narrow limits that very minute details can receive attention. Thus while working a number of years in the same area and even on the same formation new problems will constantly arise to renew the worker's zeal. I am certain that my papers recording ecologic studies in Minnesota can not be more than suggestive of what may be accomplished. The field is a most fascinating one, and I confidently look for the day when it will be sufficiently occupied. Let me urge those who have or are able to acquire a knowledge of the lichens of a limited area to turn their attention to ecologic studies.

Fayette, Iowa.

CURRENT BRYOLOGICAL LITERATURE.

A. J. GROUT.

In the Bulletin of the Torrey Botanical Club for February, 1902, Mr. R. S. Williams describes two new mosses, or rather describes two mosses as new—*Eurhynchium Tylorae* and *Brachythecium Pringlei*.

The first is the extreme development in point of size of that extremely variable species, *E. fallax* (R. & C.) Grout. This species is about as variable and perplexing as *E. stoloniferum* (Hook) J. & S. which has given rise to so many "new species." Size alone can scarcely be used as a character on which to base a new species when all intermediate gradations are frequent. It may be that this form is entitled to varietal rank as an aid to the

study of this species. In this case the largest plants in my No. 83a of N. Am. Musci Pleurocarpi should be labeled *E. fallax* var. *Taylorae* (R. S. Williams). These plants with branch leaves fully the size of Mr. Williams' type (1.5mm long) and other dimensions to correspond, grow inextricably intertangled with forms of the ordinary size. Mr. Williams' statement that "in size this plant most nearly approaches *E. Oreganum* of any of our North American species," is a clue which will readily enable the collector to recognize it. Mr. Williams type is Leiberg's No. 172 from the Traille River Basin, Idaho.

Brachythecium Pringlei is most certainly a mere variety of *B. plumosum* and differs from the var. *homomallum* only in its larger size and broader and less slenderly acuminate leaves. Except for a slight difference in these respects it agrees almost exactly with Edition I, No. 332b of the Musc. Bor. Am. of Sullivant and Lesquereux.

The only possible reason for giving this varietal rank [*B. plumosum* var. *Pringlei* (R. S. W.)] lies in the fact that the European authors describe the var. *homomallum* as more slender than the typical form and with smaller leaves. But on the other hand the American form of the *species* averages considerably smaller than the European. My own opinion is that the plant described by Mr. Williams should be regarded as a mere form of var. *homomallum*. Mr. Williams' type is from the Huachua Mts., Arizona, collected by Mr. C. G. Pringle.

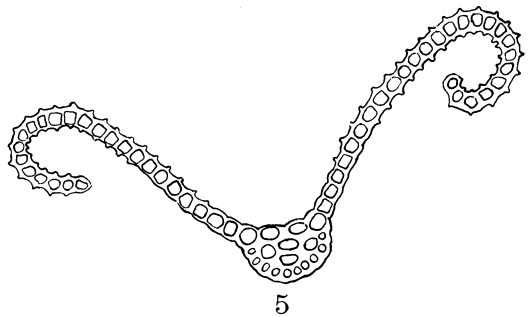
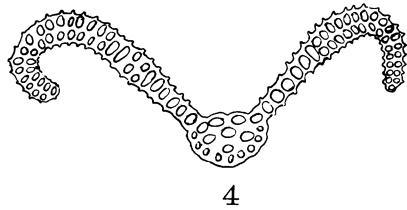
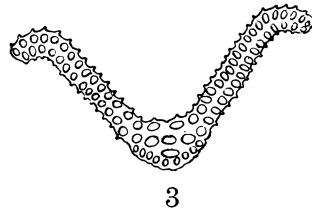
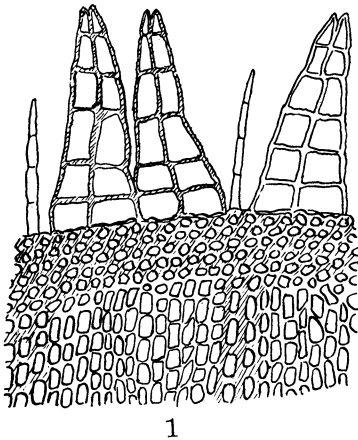
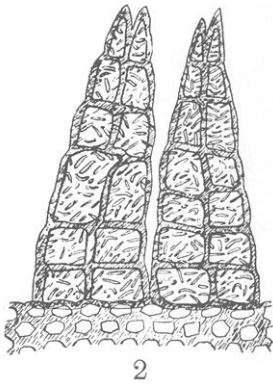
In the Bulletin of the New York Botanical Garden, Vol. 2, No. 6, May 27, 1901, Mr. Williams describes *Brachythecium petrophilum* from Dawson as new. This moss belongs in the difficult and variable *Collinum* group which is not well understood by any one as to its American forms. Mr. Williams' plant is not just like any other known to me yet it is so near some of the already too numerous species of this group that I think it unfortunate that it should be given specific rank until the whole group is better understood. If typical *Brachythecium erythrorrhizon* var. *Thedenii*, had ever been found in that part of the world I should refer it to that variety, from which it differs in its more crowded, less longly acuminate, less falcate leaves; with which it agrees in general form and areolation of leaves and slightly scabrous seta.

Mr. Williams says that his plant is nearest to *B. suberythrorrhizon* from which it differs "in the rough pedicel, leaves narrower, less serrate and plicate and cilia appendiculate."

A close examination of a seta of the type of *suberythrorrhizon* shows several low papillæ. I was unable to make out the difference in the serration of the leaves; the amount of projection at the nodes of the cilia in this group is notoriously variable. I do not think *suberythrorrhizon* is as distinct from *erythrorrhizon* as is the var. *Thedenii*, but if it be held a good species, then Mr. Williams' plant should be regarded as a poorly marked variety.

Thanks to the courtesy of Mrs. Britton and the New York Botanical Gardens, I have had access to the types, which I have carefully studied.

In the same number of the Bulletin of the New York Botanical Gardens Mr. Williams gives a very interesting report on the other mosses which he collected in the Yukon region in 1898-99. In this account he describes several new species, including two new Bryums, a genus even more difficult than *Brachythecium*. In our next issue I hope to give a full review of this paper.



F. R. del.

PLATE V.—*ORTHOTRICHUM HALLII*.

Figs. 1 and 2. Peristome with part of capsule.

Figs. 3, 4 and 5. Cross sections of leaf, from near apex, middle and base, respectively.